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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/813,988	03/22/2001	Noriko Suehiro	205040US0	2664

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EXAMINER

RUDE, TIMOTHY L

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/813,988

Applicant(s)

SUEHIRO ET AL.

Examiner

Timothy L Rude

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) 4,7,9 and 11-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8,10,22 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claims

1. Claims 1, 2, 22, and 23 are amended.

Claim Objections

2. Objection to claim 2 is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

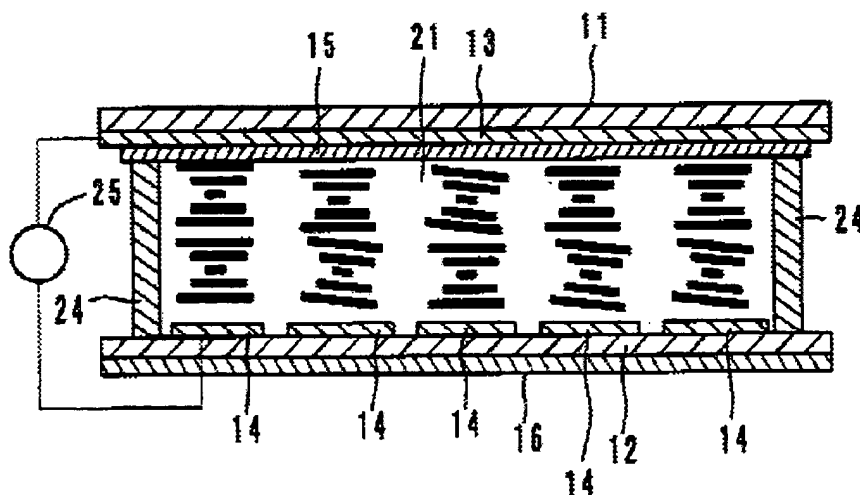
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 5, 6, 8, 10, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu et al (Iwamatsu) USPAT 6,348,961 B2 in view of Morokawa et al (Morokawa) USPAT 5,654,782.

As to claims 1 and 2, Iwamatsu discloses [Figure 1, embodiment two, col. 32, line 37-46, which has the same structure as embodiment one, col. 3, line 3, through col. 32, line 36, as constructed in numerous examples including comparative example two, col. 35, lines 24-53], a chiral nematic liquid crystal display (LCD) element that switches

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between the planar and focal-conic states with gray state capability comprising a front side substrate, 11, having a front side electrode, 13, a rear side substrate, 12, having a rear side electrode, 14, and a liquid crystal layer, 21, interposed therebetween wherein the liquid crystal layer exhibits a plurality of display states; a display state is changed by a voltage applied across the electrodes, with the electrically off state being maintained stably, the liquid crystal display element being characterized in that at least a part of the front side electrode and the front side substrate is transparent [0081]; the front side electrode is divided into a plurality of electrode regions (per Figure 5) on its substrate surface, and the thickness d (μm) of the liquid crystal layer is $7 \mu\text{m}$ [col. 33, lines 42-49].

FIG. 2

Iwamatsu does not explicitly disclose an element wherein the maximum space a (μm) between adjacent electrode regions and the thickness d (μm) of the liquid crystal layer satisfy a relational formula of $1.0 \cdot d \leq a \leq 4.0 \cdot d$.

Morokawa teaches the use of a pixel size of 100 to 200 μm to make the pixels non-distinct (better picture resolution, applicable and combinable with any type of liquid crystal matrix display, regardless of mode and liquid crystal material type) (col. 2, lines 24-28). Morokawa also teaches the use of gaps between adjacent pixels that are about 10% of the pixel dimension in order to obtain an aperture ratio of at least 80%. Those conditions result in $10 \mu\text{m} \leq a \leq 20 \mu\text{m}$.

Morokawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to combine use a pixel size of 100 to 200 μm to make the pixels non-distinct with the LCD of embodiment 5 of Hattori. This would result in $10 \mu\text{m} \leq a \leq 20 \mu\text{m}$ thereby satisfying $1.0 \cdot d \leq a \leq 4.0 \cdot d$, where $d = 7 \mu\text{m}$, specifically $7 \mu\text{m} \leq a \leq 24 \mu\text{m}$.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Hattori with the small electrode size and spacing of Morokawa to produce a high-resolution display with non-distinct pixels.

Iwamatsu does not explicitly disclose in embodiment one a chiral nematic liquid crystal used for the liquid crystal layer; the maximum space a (μm) between adjacent electrode regions, the thickness d (μm) of the liquid crystal layer, and the maximum effective voltage $V_{\text{max}}(\text{V})$ of a voltage applied to the front side electrode and the rear side electrode satisfy a relational formula of $1.0 \cdot d \leq a \leq d \cdot V_{\text{max}}/10$.

Iwamatsu also teaches in the examples use of voltages of 35 volts applied and greater.

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Morokawa teaches the use of a pixel size of 100 to 200 μm to make the pixels non-distinct (better picture resolution) (col. 2, lines 24-28). Morokawa also teaches the use of gaps between adjacent pixels that are about 10% of the pixel dimension in order to obtain an aperture ratio of at least 80%. Those conditions result in $10 \mu\text{m} \leq a \leq 20 \mu\text{m}$.

Morokawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to combine use a pixel size of 100 to 200 μm to make the pixels non-distinct with the LCD of Hattori. This would result in $10 \mu\text{m} \leq a \leq 20 \mu\text{m}$ thereby substantially satisfying $1.0 \cdot d \leq a \leq d \cdot V_{\text{max}}/10$, where $d = 7 \mu\text{m}$, specifically $7 \mu\text{m} \leq a \leq 19.2 \mu\text{m}$.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Iwamatsu with the electrode size and spacing and chiral additive of Morokawa to produce a high-resolution display with non-distinct pixels and to facilitate quick and reliable transition (faster switching).

Applicants enabling disclosure (Specification, page 15, line 18, through page 18, line 8) provides the structural requirements to achieve a liquid crystal layer in the interline portions that remains in a focalconic state. Those structural requirements and driving voltages are met by the display of Iwamatsu in view of Morokawa above.

As to claim 3, Iwamatsu discloses application of 30 V and 50 V (Applicant's 48 V or less) and $d = 5 \mu\text{m}$ (Applicant's $2.5 \mu\text{m} \leq d \leq 6.0 \mu\text{m}$) [col. 35, lines 24-53]. Also, the trend in the LCD industry is to move towards smaller dimensions of d .

As to claim 5, Iwamatsu in view of Morokawa discloses a LCD display as described above.

Iwamatsu discloses both electrodes are in the form of strips [col. 3, lines 16-20].

As to claim 6, Iwamatsu in view of Morokawa discloses a LCD display as described above.

Iwamatsu does not explicitly disclose the claimed electrode line density.

Morokawa, as combined above, teaches the use of a pixel size if between 100 and $200 \mu\text{m}$ to achieve a high-resolution display with non-distinct pixels, as described in the rejection of claim 2, above. This results in a disposition density L_d (number/mm) of the stripe-like electrodes that is substantially $5 \leq L_d \leq 10$ (well within Applicant's $2 \leq L_d \leq 15$).

As to claim 10, Iwamatsu a passive matrix device [strip electrodes]. This would result in a dot matrix display wherein figures and characters may be displayed.

Also, Morokawa teaches the use of a passive matrix device as described in the rejection of claim 5, above.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwamatsu in view of Morokawa as applied to claims 2 and 5 above, and further in view of Masuzawa 6,765,638 B1.

As to claim 8, Iwamatsu in view of Morokawa teach the display of claim 5.

Iwamatsu in view of Morokawa do not explicitly disclose reflective rear electrodes.

Masuzawa teaches the use of a reflective rear electrode in a passive matrix reflective or transreflective liquid crystal display to achieve simplified manufacture and bright high-quality image [Abstract].

Masuzawa is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add Iwamatsu in view of Morokawa. Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Iwamatsu in view of Morokawa with a reflective rear to achieve simplified manufacture and bright high-quality image.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 5, 6, 8, 10, 22, and 23 have been considered but are moot in view of the new ground(s) of rejection.

Please also note: In so far as Applicant has not argued examiner's rationale for rejection of the dependent claims, Applicant has acquiesced rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy L Rude whose telephone number is (571) 272-2301. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (571) 272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



tlr

Timothy L Rude
Examiner
Art Unit 2883



Frank G. Font
Supervisory Patent Examiner
Technology Center 2800